## TECHNICAL REPORT TITLE PAGE

**1. REPORT NO.**

TR-476

**2. REPORT DATE**

September 2003

**3. TITLE AND SUBTITLE**

Iowa Bridge Backwater Software - Version 1.0

**4. TYPE OF REPORT & PERIOD COVERED**

Software - Version 1.0, July 2002 to September 2003

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**7. ACKNOWLEDGMENT OF COOPERATING ORGANIZATIONS/INDIVIDUALS**

**8. ABSTRACT**

The Bridge Backwater software performs 4 main tasks:

Design Discharge Estimation

Stream Rating Curves

Floodway Encroachment

Bridge Backwater

Design discharge estimation: Design discharges are estimated by 2 methods, both from USGS reports for flood frequency in Iowa (Lara, 1987, Eash, 2001).

Stream Rating Curves: Stage versus discharge relationships for streams are estimated using the Manning Equation and assuming uniform flow. This is a user friendly replacement for the PC VAL program previously used in Iowa.

Floodway: Floodway encroachments can be computed, using the methods and assumptions of the Iowa Department of Natural Resources, Water Resources Division.

Bridge Backwater: The estimation of backwater from bridges is a major portion of the software. The methods used by the Iowa Department of Transportation (IDOT) and Iowa Department of Natural Resources (IDNR) for Bridge Backwater Estimation are used. These methods are based on methodology from Hydraulic Design Series 1 (HDS-1), Hydraulics of Bridge Waterways, and Federal Highway Administration (FHWA), 1970. Hydraulic Design Series 1 will be referenced throughout the manual, as HDS-1.

**9. KEY WORDS**

Hydrology,
Backwater,
Streamflow,
Drainage

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